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CUSTOM RESIDENTIAL HOUSING CONSTRUCTION: A CASE STUDY

BY

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A REPORT PRESENTED TO THE GRADUATE COMMITTEE
OF THE DEPARTMENT OF CIVIL ENGINEERING IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF ENGINEERING

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ACKNOWLEDGEMENT

I wish to thank everyone who contributed to the development of my report. Special thanks to Mickey Smith of Mickey Smith Professional Builders INC. (MSPB), for allowing me to use his business as the basis for my report. Mr. Smith's patience and willingness to share his vast construction knowledge made this report possible. Thanks to Mr. Bill Bembry and Mrs. Diane Gebhardt of MSPB for their keen insight into Mr. Smith's daily operations. I sincerely hope that the shared experience over the past year was as beneficial to MSPB as it was to my own education and development. I would also like to thank the faculty and staff of the Civil Engineering Department at the University of Florida. Their outstanding support and genuine interest exceeded my expectations and enabled me to successfully complete graduate school. Heartfelt thanks to Ms. Sigrid Gobel, for her unwavering support and unparalleled inspiration over the past year.

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ABSTRACT

This report is a synopsis of research conducted with Mickey Smith Professional Builders, Inc. (a successful custom home construction firm in Gainesville, Florida). The goal was to broaden my technical engineering knowledge and gain practical construction experience.

The majority of time was spent developing a critical path construction schedule for a typical home. Although the schedule took a tremendous amount of time to develop, the results comprise only a few pages (Table 5.1 and Appendices A through D). To make the report more comprehensive, I covered the custom home construction business in general and provided insight into the steps required to build a custom home.

Certain topics were brief or left out entirely to protect proprietary knowledge inherent to Mr. Smith's operation. To address this issue, I drafted the letter found in Section 6.1.

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CHAPTER 1
INTRODUCTION

1.1 Business Background Information

This report outlines a successful custom home construction business. The entire staff consists of three personnel (owner, construction superintendent and administrative assistant) who are capable of coordinating construction of seven houses at any one time. All design and construction work is accomplished by subcontractors. The owner and construction superintendent estimate the projects and compare their estimate to the subcontractors estimate. This comparison provides an internal check and balance against mistakes made during the estimating process and produces an accurate estimate used to evaluate subcontractor bids. Subcontractor bids are for labor only; material (procurement and delivery to the job site) is handled by the construction superintendent.

1.2 Typical Custom Home Description

Since no two custom homes are alike, I developed a list of items that were common to most of the homes being constructed:

- 3,000 square feet
- single story
- level lot
- uniform/inactive soil conditions
- negligible effects of water table on foundation design
- continuous concrete footer
- wood frame
- two-car garage
- swimming pool
- A/C and fireplace
- security system
- stereo system

The cost of a typical home runs between $60-$100/square foot. The large range in cost per square foot is primarily dependent upon cost of construction materials and amenities

the customer desires. Material costs vary dramatically, so a house that cost $150,000 today might cost $140,000 or $160,000 tomorrow. Likewise, a home with amenities such as a sauna or Jacuzzi will cost significantly more than a home with just a shower and bathtub.

1.3 Custom Home Cost Breakdown

Refer to figure 1.1 for a breakdown of costs associated with a typical home. Notice that equipment and labor are not shown since the subcontractors incur these costs.

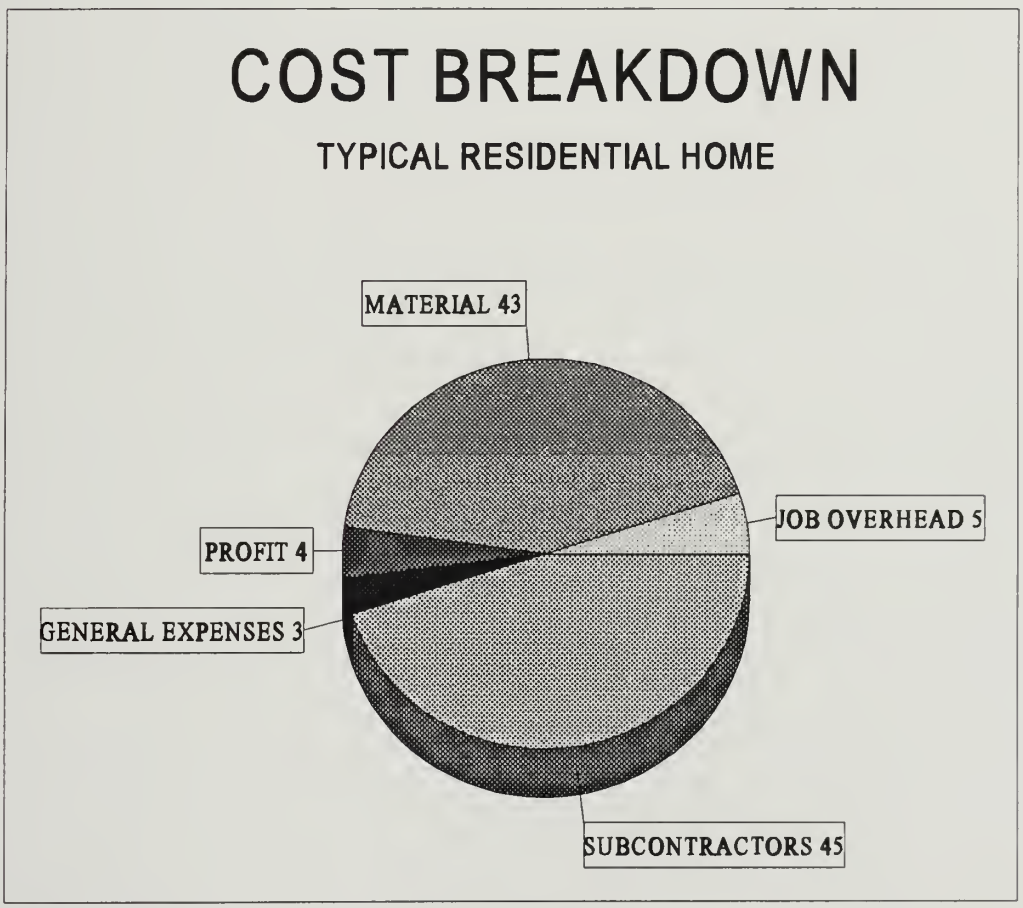


Figure 1.1 Piechart of Costs by Percentage

It is possible to survive on four percent profit, but great care must be taken when figuring general/job overhead. If these overhead figures are low, the difference comes out of the profit, leading to certain monetary losses.

CHAPTER 2
EMPLOYEE RESPONSIBILITIES

2.1 Owner's Responsibilities

The owner is a registered professional engineer, state certified residential contractor, and state registered real estate broker. In the past 12 years, he has built hundreds of homes and gained a tremendous amount of construction experience. Although he spends a good deal of time with the construction end of the operation, he believes that the most important aspect of his involvement is with financial/business matters. Specific duties include:

- acquires clients
- incurs all financial obligations
- makes financial decisions
- obtains loans if needed
- hires employees
- hires subcontractors
- negotiates/signs change orders
- ensures local, state, and federal business regulations are adhered to
- primary interface with clients
- oversees construction of all homes

The owner works constantly to ensure the success of his operation. He feels obligated to not only keep his office staff employed, but to keep his subcontractors working as well. This requires him to stay alert to housing market trends and to remain ever vigilant in his business dealings. Most of his mornings are spent touring various construction sites, resolving conflicts common to any project. Afternoons and most evenings are spent catching up on paper work and planning the next day's strategy.

2.2 Construction Superintendent's Responsibilities

A single construction superintendent oversees the construction of all houses. Specific duties include:

- primary interface with subcontractors
- quality control
- project estimating
- project scheduling
- material ordering and scheduling
- subcontractor quote/bid comparison
- subcontractor selection

The construction superintendent routinely works long hours, with his presence frequently being requested at two different locations at the same time. As several homes are constructed simultaneously, there is significant lost time due to travel. In order to reduce these instances and save travel time, a cellular phone is used. Although a great time saver, the cellular phone comes at a great price, so its use has to be controlled and justified on a continual basis.

Since only one superintendent oversees all construction, his importance to the success of the operation cannot be overemphasized. The superintendent must be knowledgeable, experienced, quick thinking, diplomatic, and energetic to effectively carry out his duties. His ability to make prudent construction and business decisions have a direct impact on the prosperity of the business. He constantly resolves discrepancies in plans/specifications and subcontractors' construction techniques. Additionally, he ensures all phases of construction are in accordance with the building code, which reduces the likelihood of future claims. Because the construction superintendent's role is so significant, extreme care must be taken when filling this position.

2.3 Administrative Assistant's Responsibilities

One administrative assistant handles all office-related duties which include:

- filing
- book keeping
- record keeping
- accounting
- payroll
- specialty material ordering/tracking
- report generation/updating

To carry out her duties, the administrative assistant uses a 486SX-25MHz computer loaded with Job Oriented Business Systems (JOBS) and Word Perfect software. JOBS is used to generate the following reports:

- accounts payable
- accounts receivable
- general ledger
- job cost
- payroll
- job scheduling

Word Perfect is the primary word processing device and is used to generate the following reports:

- deposit receipt and construction contract
- addendum "A" to contract
- sub quote comparison
- customer selections
- estimate sheet
- customer material planning document

Refer to Chapter 6 (Company Forms) for sample copies of the reports listed above.

Like the construction superintendent, the administrative assistant stays extremely busy and routinely works long hours. Aside from her regular duties, she performs additional tasks to help maintain office proficiency. She assists subcontractors in obtaining workers'

compensation, or exempt forms, and general liability insurance; compares prices from various material vendors and solicits subcontractor quotes; helps customers select/order specialty material items such as wallpaper and carpet; distributes W2's/1099's to subcontractors; generates the quarterly and annual payroll reports; and ensures subcontractors are paid on time.

2.4 Summary

Given this scenario, all three staff members are required to assist as necessary, to get the job done. It is difficult to clearly define areas of responsibility, since considerable overlapping occurs. This team-oriented working environment creates a family-type atmosphere that is conducive to the residential construction business. Everyone works toward a common goal and accepts the notion of having to do something normally required of others.

With a maximum workload each employee is critical to the process. Consequently, it is imperative that each employee be completely dedicated to the effort or the system will fail. Unlike large corporations, where the inadequacies of a few can be overcome by the rest of the organization, a business of this size has no room for sub-standard employees.

CHAPTER 3
SUBCONTRACTORS

3.1 Subcontract Activities

As previously mentioned, all design and construction is contracted out. Chapter 5, Project Planning/Scheduling, contains a comprehensive list of all construction activities performed by subcontractors. Although a typical house contains 68 construction activities, there are not 68 subcontractors. There is considerable overlapping between subs, with each handling more than one activity. For example, the foundation sub may also lay out the lot and pour all the concrete. Despite the vast amount of overlap, a typical house may still use up to 28 separate subcontractors, creating logistical challenges for the construction superintendent.

A representative subcontractor list would include:

- surveying
- soil analysis
- concrete, driveway, and walk
- plumbing
- HVAC and gas lines
- electric
- framing
- trusses
- roofing
- security system
- stereo
- insulation
- aluminum soffit
- acrocrete and drywall
- masonry
- spa
- swimming pool
- windows, mirrors and shower doors
- door hardware, garage door and vinyl shelving
- doors
- ceramic tile

- cabinets
- carpet and wallpaper
- wallpaper installation
- trim carpentry
- paint
- landscape
- house cleaning

3.2 Subcontractor Utilization

With 28 subs per house and 7 houses being built at once, coordination between the parties is quite difficult. To mitigate this problem, efforts are made to use the same subs on all houses. This practice greatly reduces confusion and delays since the owner and subcontractor deal with each other on a regular basis. Since each knows what is expected of the other (quality and timeliness of work), delays due to familiarization time, scheduling conflicts, or improper work methods/procedures are reduced.

3.3 Relationship between Subcontractors and Owner

The construction superintendent (CS) is the primary interface between the owner and the subcontractors (the owner in this instance is Mickey Smith Professional Builders vice the homeowner). The CS compares price quotes/bids from the subs, chooses the best sub for the job, schedules the subs, and monitors their performance throughout the construction process. Due to the CS's considerable experience, he handles most design/constructability issues directly at the job site with the subcontractor foreman. The CS then discusses these issues with the owner, who will then resolve the issues with the homeowner. At this point, the owner and homeowner decide on alternative solutions and their related cost.

3.4 Estimating

The estimating process can become complicated for three reasons: the large number of subcontractors involved, the subs estimating for labor only (the owner handles material and equipment), and the necessity to keep the plans/specifications in the office (to prevent unauthorized dissemination of the plans). Once all prospective subs have bid the job, the CS compares the bids and chooses a suitable contractor.

3.5 Billing Procedure

The billing procedure follows a three step process: Step 1 - Subcontractors submit their bills for all work-in-place by Wednesday of each week; Step 2 - The construction superintendent verifies all work-in-place with the administrative assistant; Step 3 - The administrative assistant pays all subs for verified work-in-place.

CHAPTER 4
SEQUENCE OF EVENTS

There are seven basic steps involved in the business of residential home construction:

- customer request
- design
- estimate
- contractual agreement
- construction schedule executed
- payment
- occupancy

4.1 Customer Requests

The number of customer requests is primarily dependent on the current housing market. Additionally, the business receives many prospective homeowners through referrals from previous clients.

4.2 Design Phase

Some clients have pre-engineered designs and only need help during the construction phase. Others develop design criteria by examining completed houses and making necessary changes to suit their needs. There are also those clients who have no design ideas and require plans to be developed from scratch.

4.3 Estimating Phase

Once the design is complete, an estimate is generated. As previously stated, the various subcontractors provide labor estimates while MSPB provides material and equipment estimates. Refer to Section 6.6 for a sample estimate sheet.

4.4 Contract Signing

Once the estimate is complete, the construction contract is signed (refer to Section 6.2 for a sample construction contract). The contract establishes a six stage payment schedule that can be summarized as follows:

- 1st stage: footings, slab, and underslab utilities completed
- 2nd stage: structure dried-in; includes trusses, sheathing, felt, and interior partitions
- 3rd stage: rough plumbing/electrical, A/C duct work, and security pre-wire completed
- 4th stage: roof, exterior wall sheathing, window installation, insulation, and interior walls completed except for paint and trim carpentry
- 5th stage: cabinets, interior doors, wall base, and ceramic tile installed
- 6th stage: construction/clean-up complete and issuance of Certificate of Occupancy

The contract further specifies that disputes be resolved through arbitration and the homeowner may not interfere with construction at the job site.

4.5 Construction Schedule/Change Orders

Although Chapter 5 addresses the construction schedule in detail, it is important to note how changes are negotiated. Any change must be agreed upon by both the homeowner and MSPB with the cost associated with the change reflected in the amount due at the next construction progress payment. Additionally, all changes must be in writing and signed by both parties, except for allowance changes, which may be increased or decreased without change orders. Verbal change orders, agreed to by both parties, shall be paid for by the homeowner within seven days after completion of the added work.

4.6 Occupancy

Once all construction improvements are complete and payment is received, a Certificate of Occupancy is issued which completes the process.

CHAPTER 5
CONSTRUCTION SCHEDULE

5.1 Scheduling Background

Prior to my involvement with MSPB, no formal project planning/scheduling was performed. Since the owner and construction superintendent are extremely knowledgeable and have years of construction experience, most planning and scheduling comes naturally. As the steps required to build residential houses are repetitive and rarely change, there is no need for sophisticated computer driven scheduling software.

I did, however, expose the owner to two scheduling software programs: CPM 18 and Primavera. After reviewing the outputs, cost, and user-friendliness of both software packages, the owner chose to use CPM 18 for his project scheduling.

Since Primavera is more versatile than CPM 18, I will use Primavera to provide a comprehensive look at a typical house construction schedule.

5.2 Construction Activity List

Table 5.1 is an activity list that was generated by myself and the owner. I visited numerous project sites to develop accurate construction activities, durations, and dependencies. Where durations were not directly observed, the owner and construction superintendent provided the missing information. Likewise, when questions on dependencies arose, answers were provided by the owner and construction superintendent. We considered the use of advanced dependencies, which would provide a more accurate schedule, but declined to use them because finish to start relationships were sufficient to suit the owner's needs.

Table 5.1 - Construction Activity Listing

ACTIVITY #	DESCRIPTION	DURATION	DEPENDS ON
1	OBTAIN BUILDING PERMIT	7	----
2	WATER METER	7	----
3	SURVEY	1	1
4	ORDER TRUSSES/WINDOWS	20	1
5	CLEAR/GRUB	2	3
6	STAKED OUT	1	5
7	POUR FOOTING	3	2,6
8	FOUNDATION BLOCK	2	7
9	SLAB FILL	1	8
10	SLAB PLUMBING/DRYER VENT	1	9
11	A/C CONDENSER LINES	1	10
12	SLAB ELECTRIC/JENN AIRE VENT	1	10
13	SOIL POISON	1	11,12
14	SLAB INSPECTION	1	13
15	POUR SLAB	2	14
16	WOODEN DECK	2	15
17	EXTERIOR WALLS	2	15
18	INTERIOR WALLS	2	17
19	SET TRUSSES	1	4,17
20	HANG EXTERIOR SHEATHING	2	17
21	FASCIA	1	19
22	STUCCO	4	20
23	BRICK/STONE	15	20
24	DRY-IN	4	21
25	PLUMBING STACK-OUT	2	18,24
26	A/C DUCT WORK	4	24
27	FIXED GLASS	1	24

Table 5.1 - continued

28	SET WINDOWS	1	24
29	ROUGH ELECTRICAL	6	24
30	SIDING	3	28
31	SECURITY PRE-WIRE	1	29
32	STEREO/TV/INTERCOM PRE-WIRE	1	29
33	ROOFING	3	29
34	SOFFIT	3	22,23,30
35	EXTERIOR PAINT	3	22,30
36	SECURITY TRIM	1	27,31
37	STEREO/TV/INTERCOM TRIM	1	32
38	FRAMING INSPECTION	1	25,26,33
39	PORCH SCREENING	2	35
40	INSULATION	2	38
41	HANG GYP-BOARD	7	40
42	HARDCOTE	4	41
43	FINISH CARPENTRY	4	42
44	SWIMMING POOL	25	42
45	GARAGE DOOR	1	42
46	CERAMIC TILE/WINDOW SILL	7	42
47	MEDICINE CABINET	1	43
48	PAINT INTERIOR	6	43
49	SET ELECTRICAL PANEL/LOCK HOUSE	1	43
50	SITE CLEANUP	2	16,39,44
51	FIRE-PLACE VENEER	1	48
52	CABINETS/VANITIES	5	48
53	SEMI-PERM ELECTRIC	2	45,49
54	FINAL GRADE	2	50
55	APPLIANCES	1	52

Table 5.1 - continued

56	WALLPAPER	5	52
57	A/C PADS	1	54
58	DRIVEWAY/SIDEWALK	3	54
59	PLUMBING TRIM	3	55
60	MIRRORS	1	56
61	HVAC TRIM	3	57
62	CARPET/VINYL FLOORING	3	58
63	LANDSCAPE	8	58
64	ELECTRICAL TRIM	5	53,57,59
65	SHOWER DOORS	1	60
66	WOOD FLOORING	8	61
67	HOUSE CLEANUP	3	34,46,47,51,62,64,65, 66
68	FINAL INSPECTION	1	36,37,63,67

5.3 Primavera Outputs

Refer to Appendices A through D to review the following construction schedule outputs:

- classic schedule report
- time-scaled logic diagram
- bar chart
- pure-logic diagram

CHAPTER 6
COMPANY FORMS

6.1 Initial Agreement Letter

2600 SW Williston Road
Apartment #708
Gainesville, FL 32608
October 8, 1993

Mr. Mickey Smith
Professional Builders Inc.
2831 N.W. 41st Street
Suite G
Gainesville, FL 32606

Dear Mr. Smith:

This letter pertains to our conversation of 8 October in which we discussed my Thesis related work with your company.

As research for my Thesis on contractor operations, I will familiarize myself with the functions of your organization. I understand that I will receive no monetary compensation for any service I may provide. Additionally, you will not be liable for any injuries I may incur during this process nor will I be liable for unintentional mistakes. I will document my research in the form of a technical report that will be used solely to satisfy my degree requirements. You maintain the right to review the report before its submission to insure only appropriate information is divulged.

Sincerely,

Mark W. Jackson
LT, CEC, USN

6.2 Deposit Receipt and Construction Contract

DEPOSIT RECEIPT AND CONSTRUCTION CONTRACT

DATE:_____

RECEIPT IS HEREBY ACKNOWLEDGED by _____, a Florida corporation, hereinafter called "Contractor", whose address is _____ _____, of _____ DOLLARS ($_____.00) from _____ and _____ Address: _____ Telephone: (__) ___ - ____, hereinafter called "Owner", as a guarantee for construction expenses on the following described improvements which contractor agrees to construct, erect and finish upon the following described real property in _____ County, Florida, and for which Owner agrees to pay or cause to be paid unto the Contractor upon the terms and conditions hereinafter set forth:

1. LEGAL DESCRIPTION OF REAL ESTATE LOCATED IN _____ COUNTY, FLORIDA:

   Lot _____ (_____), _____, a subdivision as per plat thereof recorded in Plat Book "_____", Page _____ of the Public Records of _____ County, Florida.

2. DESCRIPTION OF IMPROVEMENTS:

   A single family residence constructed in accordance with plans _____ _____ with a date of _____ said plans and specifications forming a part of this contract as fully as if attached hereto or repeated herein. Addendum "A", containing allowances for certain included items covered by this contract, is attached hereto and made a part hereof. It is agreed that the constructed residence may, because of unforseen occurrences deviate from the plans and specifications.

3. TERMS OF PAYMENT:

   Owner agrees to pay and contractor agrees to accept the total contract price of _____ ($_____.00) in progress payments as follows:

(a) The sum of $ _____ as a binder deposit, by check subject to collection receipt of which is hereby acknowledged.

All payments will be in accordance with the construction lenders draw schedule or:

(b) The sum of $ _____ upon the completion of the First stage of construction.

(c) The sum of $ _____ upon the completion of the Second stage of construction.

(d) The sum of $ _____ upon the completion of the Third stage of construction.

(e) The sum of $ _____ upon the completion of the Fourth stage of construction.

(f) The sum of $ _____ upon the completion of the Fifth stage of construction.

(g) The sum of $ _____ plus any additional charges for changes agreed upon between Owner and Contractor upon the acceptable completion of the SIXTH stage of construction.

The Six (6) stages of construction for the purposes of progress payments provided herein shall be defined as follows:

FIRST: When the slab is complete with footings, foundation walls, rough-in plumbing, condensate lines, and under slab electric.

SECOND: Structure is dried-in, including trusses, roof sheathing, felt and interior partitions.

THIRD: (a) Plumber has run stacks through the roof and extended the lines up from the slab.

(b) Electrician has finished the rough wiring.

(c) Air conditioning subcontractor has installed the duct work.

(d) Security system, if included, is pre-wired.

FOURTH: When the roof is complete, the exterior walls are sheathed, the windows are installed, and insulation and interior walls are finished except for paint and trim carpentry.

FIFTH: Cabinets, interior doors, and wall base are installed; and ceramic tile walls are complete.

SIXTH: Completion of construction including clean-up, and issuance of a Certificate of Occupancy by _____.

As used with this contract, the term "acceptable" shall mean upon the approval of the _____ building inspector. Disbursement shall be made by owner within five (5) days notice of said completion of each stage. Contractor shall execute a payment affidavit that Contractor's employees, suppliers and subcontractors have been fully paid for all work completed to the date of said disbursements.

In the event that the Owner fails to disburse any progress payment within five (5) days of notification from the Contractor that same is due, Contractor shall have the option of charging interest on the amount due at the highest rate permitted by law or pursuing any and all other remedies provided by law.

3.1 It is agreed that Owner may not withhold payment of all or a portion of the amount due because of any disagreement between Contractor and Owner relating to quality, design, or cost of any of the construction. All adjustments, if any, shall be made at the time of closing as established below.

3.2 Before closing, a list shall be agreed upon by the Owner and the Contractor of any items which are incomplete or otherwise unsatisfactory, which items shall be corrected or finished by Contractor within sixty (60) days after closing, weather and material availability permitting. As to such items, the owner shall be entitled to any remedy provided by law or in equity for the Contractor's failure to complete or correct such items.

3.3 Defects, if any, first appearing after closing shall be handled (a) in accordance with the provisions of the Home Owners Warranty Corporation Insurance/Warranty Documents, or, in the event of a dispute which does not involve a matter of warranty, (b) by compulsory arbitration pursuant to this contract.

3.4 Subject to paragraph 3.3 above, closing of the purchase by the Owner shall constitute acceptance by Owner of the structure as built and Owner's acknowledgment that the structure has been constructed or completed in accordance with the contract documents and Contractor has complied with his obligations. If requested by

Contractor, Owner shall execute a "Letter of Acceptance" in a form satisfactory to the Contractor, certifying that the improvements are and have been completed in substantial conformity with the requirements of this contract.

3.5 Possession of the structure shall be given to the Owner at closing and in no event shall Owner occupy the structure nor allow any person to occupy same until construction has been completed and payment is made in full of the contract sum and any authorized additions thereto, provided Contractor is not in default of the terms hereof.

4. CONSTRUCTION:

(a) This agreement is contingent upon Owner obtaining a construction loan in the amount of _____ within 30 days of full execution of this agreement. Owner shall use their best effort to obtain such a loan. In the event said financing is not obtained by Owner within said period, Contractor shall be entitled to keep the deposit made this day as liquidated damages for its design work and this contract and the Contract For Sale and Purchase also signed this date thereupon be cancelled and all further obligations from one party to the other shall be null and void.

(b) Contractor agrees to construct a house upon the above described lot in accordance with paragraph 2 herein, the plans and specifications of which are hereby approved by the Owner and are on file in the contractor's office.

(c) Construction of the house by Contractor shall be completed within _____ from the date of beginning construction, subject to weather, availability of materials and change orders requested by the owner.

(d) Any additions to or deletions from the improvements described in paragraph 2 shall be agreed upon between the Contractor and Owner. The additional cost or deduction will be reflected in the amount due at the next construction progress payment. All changes should be reduced to writing and signed by the parties hereto, with the exception of allowance changes which may be increased or decreased without change orders. Changes verbally agreed to by Owner and Contractor that because of time or schedule constraints are not reduced to writing immediately shall be paid for by the Owner within seven (7) days after the completion of the added work.

5. The Contractor shall perform all work in good and workmanlike manner in substantial accordance with plans and specifications. Should any dispute arise regarding the construction; or the meaning of the drawings or specifications; or respecting the true value of any extra work; or of work omitted; the dispute shall be evaluated and decided by

two competent persons -- one employed by the Owner and the other by the Contractor -- and those two shall have the power to name an arbitrator, whose decision shall be binding on all parties.

6. Owner agrees not to interfere with the construction on the premises during working hours, and to present any questions and discuss all matters pertaining to construction at the office of the Contractor. Owners, their guests and family enter on the site at their own risk and agree to hold the contractor harmless for any injuries or damages at the site.

7. The Contractor, at its own cost, is to provide all manner of materials and labor for the due performance of the work unless specifically excepted below:

EXCEPTION: Site conditions differing in excess of ten percent of the cost included in this contract ($_____) will be added by change order to the costs of the Owner. Site conditions include elevation changes, soil conditions, ground water, drainage, off-site unanticipated problems etc.

8. The Owner shall not be accountable for any loss or damage that shall or may happen to the said work, or any part or parts thereof, or for any of the materials or other things used and employed in finishing and completing the said improvements until completion of all improvements, unless the owner provided said parts or materials.

9. The Contractor will continually insure the improvements for their full value, and the policy will not expire until after the acceptable completion of the improvements.

10. The Contractor will make oath according to the laws of the State of Florida, that each artisan, laborer and materialman has been paid in full, and that there are no unpaid accounts against the improvements called for hereunder upon completion of each stage of construction prior to payment by owner.

11. All notices from one party to the other shall be hand delivered or mailed to the party at the respective addresses given above. Notices shall be deemed given on the date of receipt by the party for whom notice is intended.

12. This contract embodies the entire agreement and understanding of the parties hereto and may not be changed, altered or modified except by an instrument in writing, signed by the Owner and the Contractor.

13. It is intended that disputes be resolved per arbitration in accordance with paragraph (5), however, if any litigation arises under this agreement between Owner and Contractor, the prevailing party shall be entitled to recover from the nonprevailing party all reasonable costs incurred in the trial court and on appeal by the prevailing party including a reasonable attorney's fee.

14. Contractor shall provide, at no additional cost to the Owner, the standard ten (10) year Home Owner's Warranty Corporation protection policy. The provisions of this policy govern the warranty on this residence. Materials, equipment and Subcontractor work supplied by the Owner will not be covered by the Contractor's warranty, and will be the responsibility of the Owner. Swimming pool, and related screen enclosure, if any, along with landscaping and irrigation will be warranted by the appropriate Subcontractor and not the Contractor.

15. RADON GAS: Radon is a naturally occurring radioactive gas that, when it has accumulated in a building in sufficient quantities may present health risks to persons who are exposed to it over time. Levels of Radon that exceed federal and state guidelines have been found in buildings in Florida. Additional information regarding Radon and Radon testing may be obtained from your county public health unit.

16. Both parties agree that the project will begin, progress and end in the spirit of mutual cooperation and fairness in all matters.

IN WITNESS WHEREOF, the said parties to this contract have hereunto affixed their signatures.

CONTRACTOR:

By: _____ Date: _____

OWNER:

_____ Date: _____

_____ Date: _____

6.3 Addendum "A" to Deposit Receipt and Construction Contract

ADDENDUM "A" to CONTRACT DATED _____

BUILDING CONCRETE:

Foundation footings of _____ psi concrete reinforced with _____ #_____ reinforced steel bars.

_____ inch concrete slab reinforced with _____ steel wire mesh.

Six mil visqueen moisture barrier under living area and garage.

Soil poisoned area beneath building. Application will be at rate per pest control company's specifications at expansion joints, perimeter walls, and foundation walls. Pest Control Company will furnish owner with a written guarantee with a damage replacement clause. Owner will be required to comply with annual treatments after first year.

EXTERIOR:

_____

_____

_____

MASONRY:

Foundation block per plans.

Stone Allowance: _____, Brick Allowance: _____

Mortar Allowance:_____

CARPENTRY:

Framing lumber for walls to be 2x4 Spruce, SPF or equivalent spaced _____ on centers for bearing walls.

Roof sheathing to be _____" thick with plyclips, covered with 15# felt.

Fascia _____, Soffits _____

Pressure treated lumber will be used in areas where lumber is in contact with concrete or masonry.

Load bearing trusses to be designed by licensed structural engineer with hurricane clips on all trusses.

STAIRS:

Interior stair allowance for handrail, brackets, newel posts balusters, stair treads, etc., erection labor and painting _____ or staining _____ allowance _____.

Rough carpentry for stair structure is included in carpentry.

Carpeting, if any, is included under carpet allowance.

INTERIOR TRIM:

Upstairs base type _____, Size _____, Painted _____, Stained _____ .
Down stairs base type _____, Size _____, Painted _____, Stained _____.
Shoe Mold: _____
Closet Shelving Allowance: _____
Book Shelves: _____
Built Ins: _____
Crown Mold: _____
Window Sills: Marble _____, Wood _____
Chair Rail: _____

INSULATION:

Exterior wall insulation for living area walls: _____
Radiant barrier: _____
Ceiling insulation for all living spaces: _____
Sound insulation: _____
Wall sheathing: _____
Interior walls: _____
Resilient Channel: _____

ROOFING:

Roofing shall be: _____
Limited manufacturer's warranty: _____
Roof ventilation: _____
Gutter Allowance:_____ Skylights per plans: _____

DOORS:

Exterior doors to be wood solid core 1 3/4". Interior doors to be _____
1 3/8" thick. Interior door facing trim: _____
Metal clad doors: _____
Front door allowance: _____
Interior doors: _____
Bifold doors: _____
Door casing and jambs:_____ ; painted
_____, stained: _____
Sliding glass doors: _____
Door hardware allowance _____ for all exterior and interior doors.

STANDARD ANTIQUE BRASS HINGES ARE INCLUDED ON ALL DOORS. CHROME OR BRASS HINGES ARE AN EXTRA COST WHICH WILL BE CHARGED TO OWNER'S DOOR HARDWARE ALLOWANCE.

WINDOWS:

Aluminum:_____, Wood:_____, Screens: _____
Color of frames _____, Insulated: _____
Tinted Glass: _____
Hardcote returns: _____
Wood jambs and casings: _____

GLASS:

Fixed Glass: _____
Mirrors-Full width over bathroom vanities: + - 42" high.
Other Mirrors: _____

INTERIOR FINISHES:

Walls: _____
Ceilings: _____
Corner Bead: _____
Wallpaper Allowance:_____ labor and materials
Wallpaper locations: _____

PAINTING:

Exterior: _____
Exterior Trim: _____
Interior Walls and Ceilings: _____

One color for the interior is included in the cost of this contract. Additional color(s) will be at additional cost.
Doors: _____
Interior Wood Trim: _____

CERAMIC TILE, GLASS BLOCK AND BATH ACCESSORIES:

Allowance for all ceramic tile, bath accessories, and window sills:_____ for labor and materials.
All walls are mud set.
Glass block allowance:_____ labor and materials

FLOORING:

Wood Flooring Allowance:_____ labor and materials
Wood Floor Type: _____
Areas of wood flooring: _____
Resilient Flooring Allowance:_____ labor and materials
Areas of resilient flooring: _____
_____
Carpet and padding allowance:_____ labor and materials
Areas of carpeting: _____
_____

APPLIANCES:

Allowance for purchase, shipping, and installation _____
range/cooktop:_____, refrigerator: _____
freezer:_____, oven:_____, dishwasher: _____
disposer:_____, instant hot:_____, washer: _____
dryer:_____, compactor:_____, microwave: _____
Owner supplying the following: _____

FIREPLACE:

Allowance:_____, Type: _____
Mantle:_____, Facing: _____
Hearth:_____, Height: _____
Glass doors are included; fireplace fans are not included.

GARAGE:

Garage door and opener allowance:_____ labor and materials
Ceilings:_____, Walls: _____
Other: _____

WOODEN DECKS:

_____
_____

FENCES:

_____

SECURITY SYSTEM:

_____
Key Pads:____, Location: _____
Smoke alarms per local governing code.

CABLE TV:

Number of prewired outlets included: _____

TELEPHONE OUTLETS:

Number of prewired outlets included: _____

STEREO WIRING:

_____

CABINETS:

Total Allowance: _____
Kitchen and baths (cabinets and counters): _____
Counter Tops Specifications: _____
_____
_____
_____
Laundry Room: _____
Other cabinets: _____

ELECTRICAL:

All electrical wiring will be per plans and shall meet or exceed the appropriate local Electric Code. Additional switches, receptacles, etc., added or deleted will be added to or credited on a change order.

_____ amp service with circuit panel.
_____ Exterior 110 volt weather proof outlets.
_____ Heavy duty 220 volt outlets for power tools, etc., additional costs per circuit.
Lighting Fixture Allowance:_____ including interior and exterior lights and bulbs, dimmers.
Ceiling Fan Allowance: _____
Prewire for pool and pool light: _____
Prewire for _____ ceiling fans.
Light switch covers and receptacle covers: _____
Smoke detectors are included in security system, and will be placed in accordance with local code requirements.

HEATING AND AIR CONDITIONING:

Heat pumps:_____, Gas Furnaces:_____, Electric A/C: _____
Zones: _____
_____
_____
Electronic Air Cleaners:_____, Heat Recovery: _____
Duct System to be 1" rigid fiberglass ductboard, stapled and taped with foil tape.

Supply runouts to be flexible. Registers to be aluminum curved blade with damper. Air supply registers for walk-in closets included.

PLUMBING:

Color of Fixtures: _____
Tubs: _____, Trim: _____
Spa Allowance: _____, Trim: _____
Lavatories: _____, Trim: _____
Water Closets: _____
Kitchen Sink: _____, Trim: _____
Laundry Sink: _____, Trim: _____
Plumbing Specialties: _____
_____
_____
_____
Washer and Dryer connections included. Dryer vent to exterior included.
Water Heaters: _____
Hot water recirculating lines: _____
Copper interior water lines. PVC waste lines. Water supply to house shall be PVC.
Floor drain in utility room: _____
Ice maker hook up in kitchen: _____
Hose bibbs included: _____
Gas lines connections: _____
_____
_____

LANDSCAPING:

Allowance for lawns, plantings, irrigation system, final grade, mulch, topsoil, and etc., _____ labor and materials. Top soil required for grading will be charged against this allowance. Owner acknowledges that all landscaping and irrigation will be warranted by selected subcontractor and Mickey Smith Professional Builders, Inc. will have no responsibility or liability for warranty. Existing trees and foliage cannot be warranted against demise or damage. Owner's request for safeguarding existing trees/foliage will be honored to the best of the Contractor's abilities.

EXTERIOR CONCRETE:

Driveway and walks allowance: _____
Front stoop, standard finish broom swept concrete.
Front stoop allowance: _____
Lanai/Patio allowance: _____
Planter allowance: _____

SWIMMING POOL AND ENCLOSURE, IF APPLICABLE:

Allowance:_____, Size: _____
Deck:_____, Equipment: _____
Light:_____, Diving Board: _____
Screen Enclosure: _____

Owner acknowledges that pool, deck, and screen enclosure work will be by the selected subcontractor and that Mickey Smith Professional Builders, Inc. will have no responsibility or liability for warranty.

WARRANTY: H.O.W. TEN YEAR PROTECTION POLICY. WARRANTY COVERAGE AND PERFORMANCE STANDARDS PER HOW FORM 500 111, REV 991.

SPECIALTIES:

Safe: _____
Attic Ladder: _____
Medicine Cabinets Allowance: _____
Vacuum System: _____
Shower Door Allowance: _____
Mailbox Allowance: _____
Grab Bars Allowance: _____
Skylights Allowance: _____
Wet Bar Allowance: _____
Bar-B-Que Allowance: _____
Well Allowance: _____
Septic Tank Allowance: _____
Shutters Allowance: _____
Ironing Board: _____
Other: _____

_____

SPECIAL CONSTRUCTION:

_____

_____

_____

Delivery and taxes paid on any allowance materials are charged against owner's allocated allowance.

ANYTHING NOT SPECIFICALLY INCLUDED IN EITHER THIS CONTRACT OR THE SUBJECT PLANS IS SPECIFICALLY EXCLUDED.

6.4 Sub Quote Comparison Form

SUB QUOTE COMPARISON

FOR BIDS ON JOB:_____

DATE:_____

JOB/SUB	**SIZE/QUANTITY**	**BID AMOUNT**
A/C		
TEACO		
BOUNDS		
MID FL		
BERTIE		
CABINETS		
MAYO		
FIELDS		
BUSBY		
ACCENT CABINTERY		
CERAMIC TILE		
TAYLOR		
CONTEMP TILE		
DOOR HARDWARE		
DYNA-FIT		
GATOR DOOR		
MANNING		
ELECTRICAL		
BILSKY		

FRAMING

THOMAS

GARAGE DOOR

DYNA-FIT

LESTER

INSULATION

KAPLAN-STEIN

SUNCOAST

MIRRORS

GOLDEN GLASS

PLASTERING

MAX DANFORD

HENRY PENNY

SOUTHERN

PLUMBING

BILLY JOHNSON

SHELVING

DYNA-FIT

SHOWER DOORS

GOLDEN GLASS

TRIM

GATOR DOOR

MANNING

WHITTEMORE-LABOR

TRUSSES

RIDGEWAY

J & R

WINDOWS

1ST CLASS

WINDOW MAKER

PAN AM

GOLDEN GLASS

6.5 Customer Selections Form

CUSTOMER SELECTIONS

NAME _____ ADDRESS _____

PHONE # HOME- _____ LOT # _____
PHONE # WORK- _____ LOCATION: _____

DECORATOR:

PHONE # _____ ARCHITECT: _____

EXTERIOR:

BRICK: _____ WINDOWS: _____
MORTAR: _____ EXTERIOR WINDOW TRIM: _____
SHUTTERS: _____ SHINGLES: _____
SIDING: _____ SIZE: _____
PAINT COLOR: _____ BUTT: OR MITRED CORNERS: _____
TRIM: _____ WINDOW SILLS: _____
ROOF METAL: _____ GUTTERS: _____
DOORS: _____ DOOR COLOR: _____
FASCIA: _____ SOFFIT: _____
GARAGE DOOR: _____ NO. TRANSMITTERS: _____

FIREPLACE:

HEARTH: _____ MANTLE: _____
TILE: _____ GROUT: _____

CERAMIC TILE:

SUPPLIER: _____
POWDER ROOM: _____ GROUT: _____
MASTER BATH: _____ GROUT: _____
KITCHEN: _____ GROUT: _____
BATH #1: _____ GROUT: _____
BATH #2: _____ GROUT: _____
BATH #3: _____ GROUT: _____
BATH #4: _____ GROUT: _____

FOYER:

FLOORING: _____ WALLPAPER: _____
PAINT COLOR: _____ LIGHTING: _____

INTERIOR FINISHES:

DRYWALL: _____ HARDCOAT: _____
CEILING TEXTURE: _____

INTERIOR TRIM:

SUPPLIER: _____ STAINED: _____
PAINTED: _____ ROOMS: _____

INTERIOR DOORS:

SUPPLIER: _____ STAINED: _____
PAINTED: _____ HINGE COLOR: _____
HARDWARE: _____ FRONT DOOR: _____
F/D HARDWARE: _____ F/D STAINED: _____
F/D PAINTED: _____ OTHER: _____

CABINETS:

CABINET MAKER: _____ KITCHEN: _____

_____

VANITIES:

POWDER ROOM: _____
MASTER BATH: _____
BATH #2: _____ BATH #3: _____
BATH #4: _____

CLOSET SHELVING:

WOOD: _____ CLOSET MAID: _____

WALLPAPER:

SUPPLIER: _____

LIVING ROOM: _____	BORDER: _____
DINING ROOM: _____	BORDER: _____
MASTER BEDROOM: _____	BORDER: _____
BEDROOM #2: _____	BORDER: _____
BEDROOM #3: _____	BORDER: _____
BEDROOM #4: _____	BORDER: _____
LAUNDRY ROOM: _____	BORDER: _____
POWDER ROOM: _____	BORDER: _____
KITCHEN: _____	BORDER: _____
BREAKFAST ROOM: _____	BORDER: _____

OTHER ROOMS: _____

SECURITY:

INTERCOM: _____	STEREO: _____

ELECTRICIAN:

LIGHTING: _____	SUPPLIER: _____
FRONT DOOR: _____	

OTHER EXTERIOR DOORS:

GARAGE DOORS: _____	GARAGE INTERIOR: _____
CLOSETS: _____	HALLWAYS: _____

UTILITY ROOM: _____

LIGHTING GRIDS: _____

BATHROOM LIGHTING:

MASTER BATH: _____	BATH #2: _____
BATH #3: _____	BATH #4: _____

POWDER ROOM: _____

BEDROOM LIGHTING:

MASTER BEDROOM: _____ BEDROOM #2: _____
BEDROOM #3: _____ BEDROOM #4: _____
KITCHEN: _____ BREAKFAST ROOM: _____
DINING ROOM: _____ LIVING ROOM: _____
FAMILY ROOM: _____

FANS:

SUPPLIER: _____ MASTER BEDROOM: _____
BEDROOM #2: _____ BEDROOM #3: _____
BEDROOM #4: _____ OTHER: _____

APPLIANCES:

COLOR: _____ SUPPLIER: _____
MICROWAVE: _____ RANGE: _____
TRIM KIT: _____ OVEN: _____
HOOD: _____ TRIM KIT: _____
DISHWASHER: _____ DISPOSER: _____
REFRIGERATOR: _____ TRIM KIT: _____
COMPACTOR: _____ HOT WATER DISPENSER: _____
WASHER: _____ DRYER: _____

OTHER ITEMS:

LAUNDRY TUB: _____ IRONING BOARD: _____
OTHER: _____

MEDICINE CABINETS:

MASTER BATH: _____ BATH #2: _____
BATH #3: _____ BATH #4: _____

SPECIALTIES:

_____
_____

STAIRS:

HANDRAIL: _____ HANDRAIL BRACKETS: _____
ADDITIONAL INFORMATION: _____
_____

PLUMBING:

SUPPLIER: _____
KITCHEN: _____
WET BAR: _____
POWDER ROOM: _____ COLOR: _____
LAVATORY: _____ FAUCET: _____
WATER CLOSET: _____ ACCESSORIES: _____

MASTER BATH:

SPA: _____ COLOR: _____
SPA FACET: _____ LAVATORY: _____
LAVATORY FACET: _____ WATER CLOSET: _____
ACCESSORIES: _____ BIDET: _____
FIXTURE: _____ SHOWER OR TUB ENCLOSURE: _____
_____

BATH #2:

COLOR: _____ LAVATORY: _____
FAUCET: _____ WATER CLOSET: _____
ACCESSORIES: _____
SHOWER OR TUB ENCLOSURE: _____

BATH #3:

COLOR: _____ LAVATORY: _____
FAUCET: _____ WATER CLOSET: _____
ACCESSORIES: _____
SHOWER OR TUB ENCLOSURES: _____

BATH #4:

COLOR: _____ LAVATORY: _____
FAUCET: _____ WATER CLOSET: _____
ACCESSORIES: _____
SHOWER OR TUB ENCLOSURES: _____

MIRRORS:

_____

_____

BATH ROOM ACCESSORIES, TOWEL BARS, ETC:

_____

_____

_____

_____

WOOD FLOORING:

SUPPLIER: _____ FOYER: _____
LIVING ROOM: _____ FAMILY ROOM: _____
OTHER: _____

VINYL:

LAUNDRY ROOM: _____ BREAKFAST ROOM: _____
OTHER: _____

CARPET:

SUPPLIER: _____
LIVING ROOM: _____
DINING ROOM: _____
FAMILY ROOM: _____
MASTER BEDROOM: _____
MASTER BATH: _____ STUDY: _____
BEDROOM #2: _____ BATH: _____
BEDROOM #3: _____ BATH: _____
BEDROOM #4: _____ BATH: _____
POWDER ROOM: _____

BUILT-INS:

DESK: _____
BOOKCASES: _____
OTHER: _____

OUTSIDE ITEMS:

POOL CONTRACTOR: _____
INFORMATION ON POOL: _____
_____
_____
_____
OUTSIDE DECKS: _____
FENCES: _____
FRONT STOOP: _____
_____
DRIVES & WALKS: _____
_____

OTHER OUTSIDE PATIO, ETC:

_____
_____
SEPTIC TANK: _____ SUBCONTRACTOR: _____
WELL: _____ SUBCONTRACTOR: _____
SPRINKLER SYSTEM: _____
LANDSCAPING: _____
_____
_____
_____
MAILBOX: _____

6.6 Sample Estimate Sheet

ESTIMATE SHEET

NAME: _____
DATE: _____

SQUARE FOOTAGE HOUSE / / GARAGE

CODE	DESCRIPTION	ESTIMATED COST	NOTES
1000	CONCRETE		
2000	MASONRY-BLOCK		
203000	GLASS BLOCK		
2010	STONE		
2020	BRICK		
4000	ROUGH CARPENTRY		
5000	FINISH CARPENTRY		
5000	CUSTOM TRIM		
5010	STAIRS		
5020	WOOD SHELVING		
5030	WOOD CEILING		
6000	WATER PROOFING		
7000	INSULATION		
8000	ROOFING		
8010	BUILT UP ROOF		
9000	SHEET METAL		
9010	METAL SOFFIT/FACIA		
9020	GUTTERS		
10000	DOORS		

10010	FRONT DOOR		
10020	SLIDING GLASS DOORS		
10300	DOOR HARDWARE		
11000	WINDOWS		
12000	FIXED GLASS		
12010	MIRRORS		
13000	PLASTER/HARDCOTE		
14000	STUCCO		
15000	CERAMIC TILES		
15010	MARBLE SILLS		
15020	MARBLE VANITIES		
15030	MARBLE FLOORING		
17000	WOOD FLOORING		
18000	VINYL FLOORING		
19000	PAINTING		
19010	WALLPAPER		
20000	SPECIALTIES		
20010	MEDICINE CABINETS		
20020	VINYL SHELVING		
20030	IRONING BOARD		
20040	SKYLIGHTS		
20050	SHOWER DOORS/TUB		
21000	SECURITY SYSTEM		
21010	PREWIRE/TELE/CABLE		
21020	INTERCOM		
22000	CABINETS/VANITIES		

22100	BOOKCASES		
22020	WET BAR		
22030	BUILT INS		
23000	APPLIANCES		
25000	CARPET		
26000	SPECIAL CONSTRUCTION		
26010	FIREPLACE		
26020	GARAGE DOOR/OPENER		
26030	WOODEN DECKS		
26040	FENCES		
26050	SCREENED PORCH		
26051	SCREEN PORCH FLOOR		
26060	PLANTERS		
26070	POOL		
26080	MAILBOX		
26090	BARBECUE		
28000	PLUMBING/LABOR		
28011	PLUMBING/FIXTURES		
28010	SPA		
28020	SOLARS		
29000	HEAT/AC		
31000	ELECTRICAL/LABOR		
31010	ELECTRICAL/FIXTURE		
31020	ELECTRICAL FANS		
32000	GAS LINES		
35000	EARTH WORK/CLEAR		

36000	SITE UTILITIES/FEE		
36010	SEPTIC TANK		
36020	WELL		
37010	DRIVES AND WALKS		
37020	PATIO		
37030	FRONT STOOP		
37040	BUST CURBS		
39000	LAWNS AND PLANTING		
40000	UNUSUAL SITE CONSTR		
41010	CALLBACKS		
41020	VANDALISM/THEFT		
43000	PERMITS		
44000	HOW WARRANTY		
46000	SURVEY		
47000	LAYOUT		
55000	TEMPORARY GAS/ELEC		
56000	PORTI POTTI		
59000	TELEPHONE		
60000	CLEAN/REMOVE TRASH		
61000	FINAL CLEANUP		
81000	SALES COMMISSION		
82000	GENERAL OVERHEAD		
83000	A/E FEE AND DESIGN		
86000	OTHER FEES/SOIL TEST		
89000	BUILDERS RISK		

TOTAL ESTIMATE: _____

6.7 Customer Material Planning Document

FOR OUR CUSTOMERS

HERE IS A LIST OF "THINGS" TO DECIDE ON DURING THE DIFFERENT STAGES OF CONSTRUCTION

A) WHILE FOUNDATION IS UNDER CONSTRUCTION:

1. ELECTRICAL REQUIREMENTS IN THE SLAB-FLOOR PLUGS, ETC.
2. WINDOWS AND PATIO DOORS LOCATION, STYLE, SIZES, COLOR... ANY CHANGES FROM PLANS.
3. WILL YOUR HOME HAVE A FIREPLACE? IF SO, WILL IT BE STANDARD OR RAISED HEARTH TYPE? HOW HIGH WILL THE HEARTH BE? DO YOU WANT A GAS LOG LIGHTER? IT'S NOT TOO EARLY TO BEGIN THINKING ABOUT THE FINISH OF THE FIREPLACE. WILL YOU WANT A MANTLE? WHAT TYPE AND STYLE? WHAT TYPE OF SURROUND? MARBLE, BRICK, OR CERAMIC HEARTH, OR SOME OTHER TYPE?
4. TYPE OF PLUMBING FIXTURES (FAUCETS, WHIRLPOOL TUB, ETC,) WHAT COLOR FIXTURES FOR ALL THE BATHS? KITCHEN SINK: PORCELAIN OR STAINLESS STEEL? SIZE AND MODEL OF KITCHEN SINK? ANY SPECIAL PLUMBING FIXTURES REQUIRED? KITCHEN SINK FAUCET WITH SPRAY ATTACHMENT, SOAP DISPENSER, HOT WATER DISPENSER?
5. WHAT MATERIALS ARE BEING USED ON THE EXTERIOR? DO YOU WANT STAIN OR PAINT? WHAT COLORS?
6. WHAT COLOR OF TRIM FOR WINDOWS AND OUTSIDE DOORS?
7. DO YOU WANT A GAS LINE FOR CONNECTION FOR AN OUTSIDE GRILL?
8. WHAT COLOR ROOF SHINGLES?
9. PICK CERAMIC TILE COLORS.
10. PICK FRONT DOOR STYLE.

B) WHEN WOOD FRAMING IS BEING STARTED:

1. WILL THERE BE ANY SPECIAL RECESSES OR BLOCKING IN THE WALLS FOR SAFES, MEDICINE CABINETS, TOILET PAPER HOLDERS, SHAMPOO WALL RECESSES, WALL NICHES, GRAB BARS, ETC.? IF SO, WE NEED TO KNOW THE SIZES OF THE OPENINGS AND WHERE THEY WILL BE LOCATED.

AFTER TRUSSES ARE SET, SKYLIGHT LOCATIONS CAN BE ACCURATELY DETERMINED.

2. **ELECTRICAL:**

YOU WILL BE ASKED TO MEET THE ELECTRICIAN AT THE HOUSE TO "SPOT" THE WALL PLUGS, SWITCHES, TV JACKS, PHONE JACKS, CABLE JACKS, RECESSED LIGHTS, ETC. PLEASE GIVE THIS YOUR ATTENTION. REMEMBER THAT IT IS FAR LESS EXPENSIVE TO INSTALL OUTLETS AT THIS TIME RATHER THAN LATER ON. THINK ABOUT THE RELATIONSHIP OF YOUR FURNITURE AND FURNISHINGS TO WALL PLUGS, LIGHTING, SWITCHES, ETC.

a) THINK ABOUT ANY SPECIAL HEIGHTS THAT YOU WANT ELECTRICAL, PHONE, TV OUTLETS PLACED, I.E. TO ACCOMMODATE FURNISHINGS OR YOUR ELECTRIC/ELECTRONIC EQUIPMENT.
b) WILL YOU WANT ANY SPECIAL LIGHTS (SPOTS, RECESSED UNITS, OUTSIDE FLOOD LIGHTS)?
c) DO YOU WANT CEILING FANS, FANS WITH LIGHTS, OR JUST CEILING LIGHTS? CEILING FANS WITH LIGHTS TAKE SPECIAL WIRING. WHERE WILL THE FANS BE LOCATED?
d) WILL YOU REQUIRE ANY SPECIAL OUTLETS FOR STEREO SPEAKERS? IF SO, WHERE? EXTRA OUTLETS MAY BE ADDED CHARGE.
e) SECURITY SYSTEM SPECIAL REQUIREMENTS, IF ANY? SECURITY LIGHTING IF ANY?

3. **CABINETS:**

a) PICK OUT THE STYLE AND FINISH YOU LIKE. ARE THERE ANY SPECIAL CABINETS YOU DESIRE SUCH AS A LAZY SUSAN, WINE RACK, TRAY HOLDER, APPLIANCE GARAGE, ETC.?
b) SELECT BATHROOM AND LAUNDRY CABINETS, AS APPLICABLE.
c) PICK LAMINATE FOR KITCHEN, BATHS, LAUNDRY, BAR OR OTHER PLACES AS REQUIRED. LET US KNOW OF LAMINATE PRODUCT, COLOR, NUMBER, AND OTHER PERTINENT INFORMATION SUCH AS COUNTERTOP BEVEL EDGES, ETC.

****NOTE: IN ORDER TO NOT HOLD UP CONSTRUCTION PROGRESS, CABINET SPECIFICATIONS MUST BE "FINALIZED" AS EARLY AS POSSIBLE ALONG WITH APPLIANCE SELECTION.**

C) WHEN INTERIOR WALL BOARD IS BEING HUNG:

1. WHAT COLOR STAIN OR PAINT DO YOU WANT ON YOUR WOODWORK?
2. WILL YOU WANT HARDCOAT SMOOTH OR TEXTURED? WHAT COLORS OF PAINT FOR THE WALLS AND CEILINGS?
3. WILL YOU WANT WALLPAPER ON ANY WALLS? WHERE? WALLPAPERING IS AN ALLOWANCE ITEM.
4. WHAT TYPE OF CORNER TREATMENT-ROUND OR 90 ?
5. ARE THERE ANY CHANGES IN INTERIOR CARPENTRY TRIM, DOORS, BASE, CROWN, ETC.?
6. **LIGHTING FIXTURES:**

   FIXTURES MAY TAKE SEVERAL WEEKS TO ARRIVE AFTER BEING ORDERED. WE RECOMMEND THAT YOU SELECT THEM AS EARLY AS POSSIBLE.

   THE FOLLOWING WILL HELP REMIND YOU OF WHAT LIGHT FIXTURES ARE TYPICALLY NEEDED:

   *the front door. On both sides or ceiling or both?
   *the overhead garage door. On both sides?
   *side garage door
   *back patio door
   *ceiling fans
   *bathroom lighting
   *any ceiling bedroom lights

*foyer	*halls	*door chimes
*kitchen	*special needs	*laundry room ceiling
*family room	*living room	*exterior
*dining room	*study	*breakfast nook
*closets	*pool area	

   LIGHTING FIXTURES, BULBS, ETC., ARE ALLOWANCE ITEMS SO TRY AND STAY CURRENT ON YOUR COSTS.

7. **KITCHEN FIXTURES:**

a) PICK OUT ALL APPLIANCES SO THEY CAN BE ORDERED. APPLIANCES TO THINK ABOUT: REFRIGERATOR, STOVE OR COOK TOP, SEPARATE MICROWAVE (REQUIRES SPECIAL WIRING), TRASH COMPACTOR, RANGE HOOD, DISHWASHER, DISPOSER, INSTANT HOT WATER, OVENS, WASHER, DRYER.

REMEMBER THAT ALL APPLIANCE SELECTIONS SHOULD BE FINAL BEFORE CABINETS GO INTO PRODUCTION!!!

8. **BATHROOMS:**

a) WE MUST KNOW OF ANY SPECIAL RECESSED ITEMS TO GO IN THESE ROOMS.
b) WHAT TYPE, STYLE, & FINISH OF FAUCETS?
c) MEDICINE CABINETS-WHAT SIZE, TYPE, STYLE?
d) WHERE AND HOW MANY TOWEL BARS DO YOU NEED?
e) ARE THERE TO BE SHOWER DOORS OR SHOWER CURTAIN RODS?
f) WHAT TYPE, STYLE, COLOR, ETC., OF TOILETS.
g) TYPE OF SHOWER, BATH VALVES, AND SHOWER HEADS; LOCATION OF SHOWER HEADS AND VALVES.

9. **MISCELLANEOUS ITEMS:**

a) PICK OUT CARPET AND SHEET VINYL AS APPLICABLE.
b) PICK OUT CERAMIC TILE AND GROUT COLOR FOR FOYER, BATHS, ETC.
c) PICK OUT WALLPAPER AND GIVE US THE NAME OF THE BOOK, PAGE NUMBER, NAME, AND ANY OTHER PERTINENT INFORMATION TO HELP US ORDER THE CORRECT PAPER.
d) WOOD FLOORING TYPE, FINISH, AND ANY OTHER PERTINENT INFORMATION.
e) INTERVIEW LANDSCAPERS AND GET PROPOSALS AFTER COMPLETION OF HARDCOAT PLASTER.
f) PICK OUT GARAGE DOOR.

WE HAVE NOT MEANT TO "MIND-BOGGLE" YOU, ONLY TO HELP YOU MAKE THESE CHOICES WELL IN ADVANCE OF WHEN THEY WILL BE NEEDED. PLEASE GIVE US ALL OF YOUR INFORMATION AS SOON AS POSSIBLE SO THAT ALL ITEMS CAN BE ORDERED IN TIME TO AVOID DELAYS.

CHAPTER 7
SUMMARY AND RECOMMENDATIONS

7.1 Summary

I accomplished exactly what I set out to when starting this report: I enhanced my technical engineering knowledge and gained valuable construction experience.

This report is a combination of the field work I conducted with MSPB, my academic studies over the past year, and several computer software applications. I have benefitted tremendously from this exercise, and the experience will pay great dividends in future duty assignments.

7.2 Recommendations

It would be very difficult to make recommendations concerning a highly successful business such as MSPB (the adage, "If it ain't broke don't fix it," definitely applies here). One recommendation I did make was to utilize computer-driven project scheduling techniques. When I first started conducting research, I noticed that project schedules were not being generated for two major reasons. The first was lack of time and the second was schedules were not necessary. Clients were not interested in seeing elaborate schedules, they just wanted their houses to be built. As I mentioned in Chapter 5, the owner and construction superintendent have so much experience building homes, that planning/scheduling is done in their heads. Nevertheless, we developed a list of construction activities and scheduled a typical house using CPM 18 and Primavera. The results of this effort are contained in Chapter 5 and Appendices A through D. Although CPM 18 and Primavera are great time savers when compared to hand generating schedules, it takes a considerable amount of time to become proficient in their use. Since CPM 18 is

much easier to manipulate, and provided the owner with everything he needed, he chose it over Primavera. I would like to think that computer scheduling has helped the owner, but it probably has not been all that beneficial. The staff stays so busy performing regular duties that a schedule is more like a nicety than a necessity. The office has been doing business the same way for so long, that the time required to learn a new trick is not justified. As with all computer applications, if you do not continually use them, you tend to forget how they operate and have to learn the whole process over again.

My other recommendation would be to utilize computer-driven estimating software. This idea has great merit and would definitely save the owner a significant amount of time. The problem is I no longer have any time left - sounds like a good subject for next year's crop of graduate students to research.

APPENDIX A
CLASSIC SCHEDULE REPORT

)NAL BUILDERS, INC. PRIMAVERA PROJECT PLANNER TYPICAL HOUSE CPM

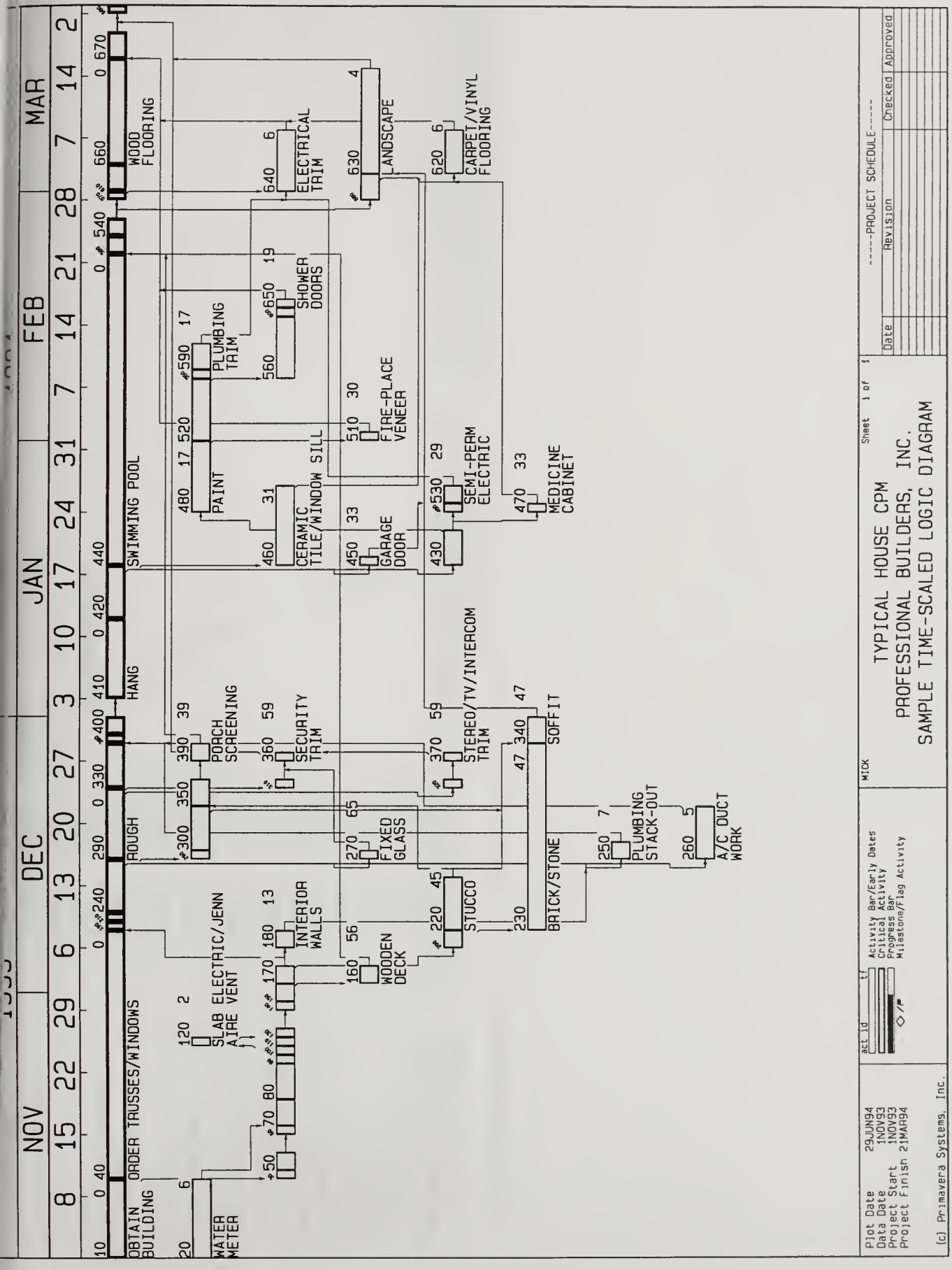
ATE 29JUN94 RUN NO. 7 START DATE 1NOV93 FIN DATE 21MAR94
8:45
CSCHEDULE REPORT - SORT BY ES, TF DATA DATE 1NOV93 PAGE NO. 1

ITY I	ORIG DUR	REM DUR	%	CODE	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	LATE START	LATE FINISH	TOTAL FLOAT
10	7	7	0		OBTAIN BUILDING PERMIT	1NOV93	9NOV93	1NOV93	9NOV93	0
20	7	7	0		WATER METER	1NOV93	9NOV93	9NOV93	17NOV93	6
40	20	20	0		ORDER TRUSSES/WINDOWS	10NOV93	7DEC93	10NOV93	7DEC93	0
30	1	1	0		SURVEY	10NOV93	10NOV93	12NOV93	12NOV93	2
50	2	2	0		CLEAR/GRUB	11NOV93	12NOV93	15NOV93	16NOV93	2
60	1	1	0		STAKE OUT	15NOV93	15NOV93	17NOV93	17NOV93	2
70	3	3	0		POUR FOOTING	16NOV93	18NOV93	18NOV93	22NOV93	2
80	2	2	0		FOUNDATION BLOCK	19NOV93	22NOV93	23NOV93	24NOV93	2
90	1	1	0		SLAB FILL	23NOV93	23NOV93	25NOV93	25NOV93	2
100	1	1	0		SLAB PLUMBING/DRYER VENT	24NOV93	24NOV93	26NOV93	26NOV93	2
110	1	1	0		A/C CONDENSER LINES	25NOV93	25NOV93	29NOV93	29NOV93	2
120	1	1	0		SLAB ELECTRIC/JENN AIRE VENT	25NOV93	25NOV93	29NOV93	29NOV93	2
130	1	1	0		SOIL POISON	26NOV93	26NOV93	30NOV93	30NOV93	2
140	1	1	0		SLAB INSPECTION	29NOV93	29NOV93	1DEC93	1DEC93	2
150	2	2	0		POUR SLAB	30NOV93	1DEC93	2DEC93	3DEC93	2
170	2	2	0		EXTERIOR WALLS	2DEC93	3DEC93	6DEC93	7DEC93	2
160	2	2	0		WOODEN DECK	2DEC93	3DEC93	18FEB94	21FEB94	56
180	2	2	0		INTERIOR WALLS	6DEC93	7DEC93	23DEC93	24DEC93	13
200	2	2	0		HANG EXTERIOR SHEATHING	6DEC93	7DEC93	7FEB94	8FEB94	45
190	1	1	0		SET TRUSSES	8DEC93	8DEC93	8DEC93	8DEC93	0
220	4	4	0		STUCCO	8DEC93	13DEC93	9FEB94	14FEB94	45
230	15	15	0		BRICK/STONE	8DEC93	28DEC93	11FEB94	3MAR94	47
210	1	1	0		FASCIA	9DEC93	9DEC93	9DEC93	9DEC93	0
240	4	4	0		DRY-IN	10DEC93	15DEC93	10DEC93	15DEC93	0
290	6	6	0		ROUGH ELECTRICAL	16DEC93	23DEC93	16DEC93	23DEC93	0
260	4	4	0		A/C DUCT WORK	16DEC93	21DEC93	23DEC93	28DEC93	5
250	2	2	0		PLUMBING STACK-OUT	16DEC93	17DEC93	27DEC93	28DEC93	7
280	1	1	0		SET WINDOWS	16DEC93	16DEC93	9FEB94	9FEB94	39
270	1	1	0		FIXED GLASS	16DEC93	16DEC93	17MAR94	17MAR94	65
300	3	3	0		SIDING	17DEC93	21DEC93	10FEB94	14FEB94	39

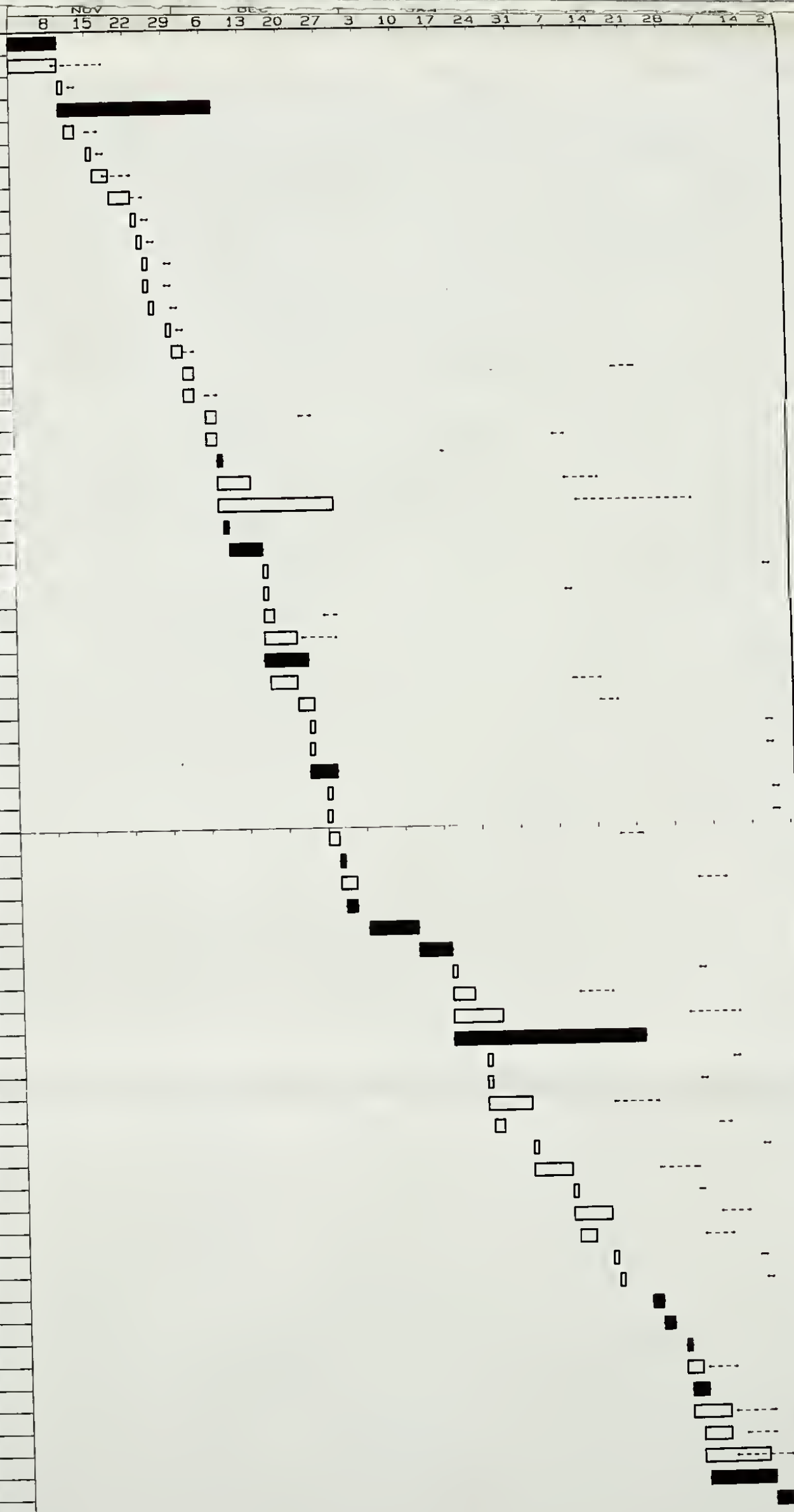
ITY I	ORIG DUR	REM DUR	%	CODE	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	LATE START	LATE FINISH	TOTAL FLOAT
350	3	3	0		EXTERIOR PAINT	22DEC93	24DEC93	15FEB94	17FEB94	39
330	3	3	0		ROOFING	24DEC93	28DEC93	24DEC93	28DEC93	0
310	1	1	0		SECURITY PRE-WIRE	24DEC93	24DEC93	17MAR94	17MAR94	59
320	1	1	0		STEREO/TV/INTERCOM PRE-WIRE	24DEC93	24DEC93	17MAR94	17MAR94	59
390	2	2	0		PORCH SCREENING	27DEC93	28DEC93	18FEB94	21FEB94	39
360	1	1	0		SECURITY TRIM	27DEC93	27DEC93	18MAR94	18MAR94	59
370	1	1	0		STEREO/TV/INTERCOM TRIM	27DEC93	27DEC93	18MAR94	18MAR94	59
380	1	1	0		FRAMING INSPECTION	29DEC93	29DEC93	29DEC93	29DEC93	0
340	3	3	0		SOFFIT	29DEC93	31DEC93	4MAR94	8MAR94	47
400	2	2	0		INSULATION	30DEC93	31DEC93	30DEC93	31DEC93	0
410	7	7	0		HANG GYP-BOARD	3JAN94	11JAN94	3JAN94	11JAN94	0
420	4	4	0		HARDCOTE	12JAN94	17JAN94	12JAN94	17JAN94	0
440	25	25	0		SWIMMING POOL	18JAN94	21FEB94	18JAN94	21FEB94	0
430	4	4	0		FINISH CARPENTRY	18JAN94	21JAN94	10FEB94	15FEB94	17
460	7	7	0		CERAMIC TILE/WINDOW SILL	18JAN94	26JAN94	2MAR94	10MAR94	31
450	1	1	0		GARAGE DOOR	18JAN94	18JAN94	4MAR94	4MAR94	33
480	6	6	0		PAINT INTERIOR	24JAN94	31JAN94	16FEB94	23FEB94	17
490	1	1	0		SET ELECTRICAL PANEL/LOCK HOUSE	24JAN94	24JAN94	4MAR94	4MAR94	29
470	1	1	0		MEDICINE CABINET	24JAN94	24JAN94	10MAR94	10MAR94	33
530	2	2	0		SEMI-PERM ELECTRIC	25JAN94	26JAN94	7MAR94	8MAR94	29
520	5	5	0		CABINETS/VANITIES	1FEB94	7FEB94	24FEB94	2MAR94	17
510	1	1	0		FIRE-PLACE VENEER	1FEB94	1FEB94	15MAR94	15MAR94	30
550	1	1	0		APPLIANCES	8FEB94	8FEB94	3MAR94	3MAR94	17
560	5	5	0		WALLPAPER	8FEB94	14FEB94	7MAR94	11MAR94	19
590	3	3	0		PLUMBING TRIM	9FEB94	11FEB94	4MAR94	8MAR94	17
600	1	1	0		MIRRORS	15FEB94	15FEB94	14MAR94	14MAR94	19
650	1	1	0		SHOWER DOORS	16FEB94	16FEB94	15MAR94	15MAR94	19
500	2	2	0		SITE CLEAN-UP	22FEB94	23FEB94	22FEB94	23FEB94	0
540	2	2	0		FINAL GRADE	24FEB94	25FEB94	24FEB94	25FEB94	0
570	1	1	0		A/C PADS	28FEB94	28FEB94	28FEB94	28FEB94	0

ITY	ORIG DUR	REM DUR	%	CODE	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	LATE START	LATE FINISH	TOTAL FLOAT
580	3	3	0		DRIVEWAY/SIDEWALK	28FEB94	2MAR94	4MAR94	8MAR94	4
610	3	3	0		HVAC TRIM	1MAR94	3MAR94	1MAR94	3MAR94	0
640	5	5	0		ELECTRICAL TRIM	1MAR94	7MAR94	9MAR94	15MAR94	6
630	8	8	0		LANDSCAPE	3MAR94	14MAR94	9MAR94	18MAR94	4
620	3	3	0		CARPET/VINYL FLOORING	3MAR94	7MAR94	11MAR94	15MAR94	6
660	8	8	0		WOOD FLOORING	4MAR94	15MAR94	4MAR94	15MAR94	0
670	3	3	0		HOUSE CLEAN-UP	16MAR94	18MAR94	16MAR94	18MAR94	0
680	1	1	0		FINAL INSPECTION	21MAR94	21MAR94	21MAR94	21MAR94	0

APPENDIX B
TIME-SCALED LOGIC DIAGRAM



ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH
OBTAIN BUILDING PERMIT	1NOV93	9NOV93
WATER METER	1NOV93	9NOV93
SURVEY	10NOV93	10NOV93
ORDER TRUSSES/WINDOWS	10NOV93	7DEC93
CLEAR/GRUB	11NOV93	12NOV93
STAKE OUT	15NOV93	15NOV93
POUR FOOTING	16NOV93	18NOV93
FOUNDATION BLOCK	19NOV93	22NOV93
SLAB FILL	23NOV93	23NOV93
SLAB PLUMBING/DRYER VENT	24NOV93	24NOV93
A/C CONDENSER LINES	25NOV93	25NOV93
SLAB ELECTRIC/JENN AIRE VENT	25NOV93	25NOV93
SOIL POISON	26NOV93	26NOV93
SLAB INSPECTION	29NOV93	29NOV93
POUR SLAB	30NOV93	1DEC93
WOODEN DECK	2DEC93	3DEC93
EXTERIOR WALLS	2DEC93	3DEC93
INTERIOR WALLS	6DEC93	7DEC93
HANG EXTERIOR SHEATHING	6DEC93	7DEC93
SET TRUSSES	8DEC93	8DEC93
STUCCO	8DEC93	13DEC93
BRICK/STONE	8DEC93	28DEC93
FASCIA	9DEC93	9DEC93
DRY-IN	10DEC93	15DEC93
FIXED GLASS	16DEC93	16DEC93
SET WINDOWS	16DEC93	16DEC93
PLUMBING STACK-OUT	16DEC93	17DEC93
A/C DUCT WORK	16DEC93	21DEC93
ROUGH ELECTRICAL	16DEC93	23DEC93
SIDING	17DEC93	21DEC93
EXTERIOR PAINT	22DEC93	24DEC93
SECURITY PRE-WIRE	24DEC93	24DEC93
STEREO/TV/INTERCOM PRE-WIRE	24DEC93	24DEC93
ROOFING	24DEC93	28DEC93
SECURITY TRIM	27DEC93	27DEC93
STEREO/TV/INTERCOM TRIM	27DEC93	27DEC93
PORCH SCREENING	27DEC93	28DEC93
FRAMING INSPECTION	29DEC93	29DEC93
SOFFIT	29DEC93	31DEC93
INSULATION	30DEC93	31DEC93
HANG GYP-BOARD	3JAN94	11JAN94
MAROCOTE	12JAN94	17JAN94
GARAGE DOOR	18JAN94	18JAN94
FINISH CARPENTRY	18JAN94	21JAN94
CERAMIC TILE/WINDOW SILL	18JAN94	26JAN94
SWIMMING POOL	18JAN94	21FEB94
MEDICINE CABINET	24JAN94	24JAN94
SET ELECTRICAL PANEL/LOCK HOUSE	24JAN94	24JAN94
PAINT INTERIOR	24JAN94	31JAN94
SEMI-PERM ELECTRIC	25JAN94	26JAN94
FIRE-PLACE VENEER	1FEB94	1FEB94
CABINETS/VANITIES	1FEB94	7FEB94
APPLIANCES	8FEB94	8FEB94
WALLPAPER	8FEB94	14FEB94
PLUMBING TRIM	9FEB94	11FEB94
MIRRORS	15FEB94	15FEB94
SHOWER DOORS	16FEB94	16FEB94
SITE CLEAN-UP	22FEB94	23FEB94
FINAL GRADE	24FEB94	25FEB94
A/C PADS	28FEB94	28FEB94
DRIVEWAY/SIDEWALK	28FEB94	2MAR94
HVAC TRIM	1MAR94	3MAR94
ELECTRICAL TRIM	1MAR94	7MAR94
CARPET/VINYL FLOORING	3MAR94	7MAR94
LANDSCAPE	3MAR94	14MAR94
WOOD FLOORING	4MAR94	15MAR94
HOUSE CLEAN-UP	16MAR94	18MAR94
FINAL INSPECTION	21MAR94	21MAR94



Plot Date 29JUN94
Data Date 1NOV93
Project Start 1NOV93
Project Finish 21MAR94

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Activity Bar/Early Dates
Critical Activity
Progress Bar
Activity Late Dates
Milestone/Flag Activity

WICK

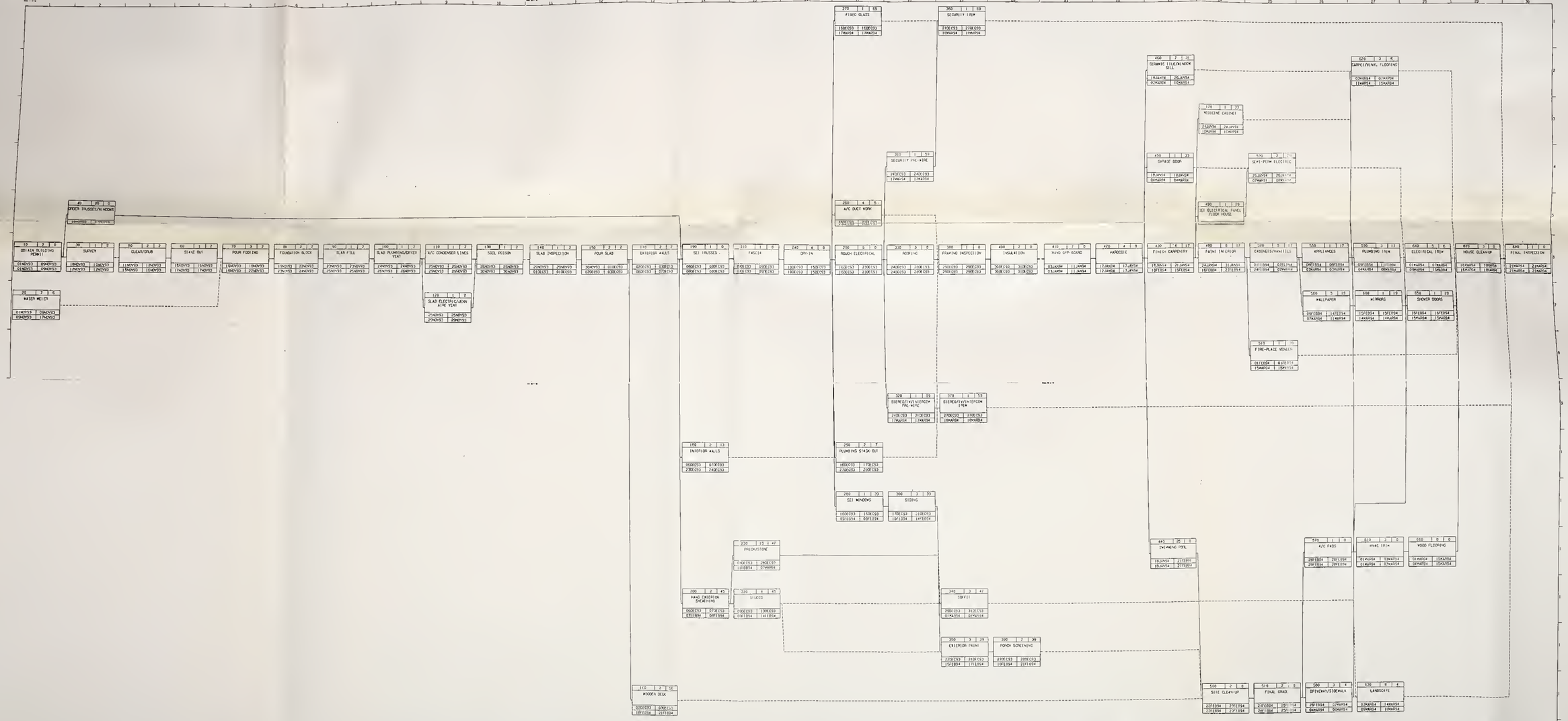
Sheet 2 of 2

TYPICAL HOUSE CPM
PROFESSIONAL BUILDERS, INC.
SAMPLE BAR CHART

-----PROJECT SCHEDULE-----

Date	Revision	Checked	Approved

APPEND IX C


10 | 2 | 0
OBTAIN BUILDING PERMIT
01NOV93 | 01NOV93
01NOV93 | 01NOV93
20 | 7 | 6
WATER METER
01NOV93 | 01NOV93
02NOV93 | 17NOV93
30 | 1 | 2
SURVEY
18NOV93 | 19NOV93
19NOV93 | 22NOV93
40 | 20 | 5
ORDER TRUSSES/WINDOWS
50 | 2 | 2
CLEAR/GRUB
22NOV93 | 24NOV93
23NOV93 | 24NOV93
60 | 1 | 2
STAKE OUT
15NOV93 | 15NOV93
17NOV93 | 17NOV93
70 | 3 | 2
POUR FOOTING
18NOV93 | 18NOV93
19NOV93 | 22NOV93
80 | 2 | 2
FOUNDATION BLOCK
23NOV93 | 23NOV93
24NOV93 | 24NOV93
90 | 1 | 2
SLAB FILL
27NOV93 | 27NOV93
29NOV93 | 29NOV93
100 | 1 | 2
SLAB PLUMBING/DRYER VENT
24NOV93 | 24NOV93
29NOV93 | 29NOV93
110 | 1 | 2
A/C CONDENSER LINES
25NOV93 | 25NOV93
29NOV93 | 29NOV93
120 | 1 | 2
SLAB ELECTRICAL/GAS/H2O A/C VENT
25NOV93 | 25NOV93
29NOV93 | 29NOV93
130 | 1 | 2
SOIL POISON
25NOV93 | 25NOV93
30NOV93 | 30NOV93
140 | 1 | 2
SLAB INSPECTION
29NOV93 | 29NOV93
01DEC93 | 01DEC93
150 | 2 | 2
POUR SLAB
30NOV93 | 01DEC93
02DEC93 | 03DEC93
110 | 2 | 2
EXTERIOR WALLS
02DEC93 | 03DEC93
06DEC93 | 07DEC93
160 | 2 | 0
WOOD DECK
02DEC93 | 07DEC93
18FEB94 | 21FEB94
190 | 1 | 0
SET TRUSSES
08DEC93 | 08DEC93
08DEC93 | 08DEC93
190 | 2 | 13
INTERIOR WALLS
09DEC93 | 01JAN94
23DEC93 | 24DEC93
200 | 2 | 45
HARD EXTERIOR SHEATHING
06DEC93 | 07JAN94
22FEB94 | 04MAR94
210 | 1 | 0
FASCIA
09DEC93 | 09DEC93
09DEC93 | 09DEC93
220 | 15 | 47
PARTITIONS
04JAN94 | 26JAN94
11FEB94 | 07MAR94
220 | 4 | 47
STUCCO
04JAN94 | 13JAN94
09FEB94 | 14FEB94
230 | 4 | 0
DRY-IN
10DEC93 | 15DEC93
10DEC93 | 15DEC93
240 | 4 | 0
ROUGH ELECTRICAL
16DEC93 | 23DEC93
16DEC93 | 23DEC93
250 | 2 | 7
PLUMBING STACK-OUT
16DEC93 | 17DEC93
27DEC93 | 28DEC93
260 | 1 | 32
SET WINDOWS
16DEC93 | 16DEC93
05FEB94 | 09FEB94
270 | 1 | 65
FIXED GLASS
16DEC93 | 16DEC93
17MAR94 | 17MAR94
280 | 4 | 5
A/C DUCT WORK
16DEC93 | 22DEC93
22DEC93 | 22DEC93
290 | 5 | 0
ROUGH ELECTRICAL
16DEC93 | 23DEC93
16DEC93 | 23DEC93
300 | 3 | 0
ROOFING
24DEC93 | 29DEC93
24DEC93 | 29DEC93
300 | 1 | 39
SIDING
17DEC93 | 21DEC93
15FEB94 | 14FEB94
310 | 1 | 53
SECURITY PRE-WIRE
14DEC93 | 24DEC93
13MAR94 | 17MAR94
320 | 1 | 59
SECURITY/INTERCOM PRE-WIRE
24DEC93 | 21DEC93
17MAR94 | 11MAR94
330 | 1 | 0
FRAMING INSPECTION
29DEC93 | 29DEC93
29DEC93 | 29DEC93
340 | 3 | 47
DRAIN
29DEC93 | 31DEC93
01MAR94 | 09MAR94
350 | 3 | 39
EXTERIOR PAINT
22DEC93 | 31DEC93
15FEB94 | 17FEB94
360 | 1 | 59
SECURITY TRIM
27DEC93 | 27DEC93
18MAR94 | 18MAR94
370 | 1 | 53
SECURITY/INTERCOM TRIM
27DEC93 | 27DEC93
18MAR94 | 18MAR94
380 | 2 | 39
PORCH SCREENING
27DEC93 | 30DEC93
18FEB94 | 21FEB94
400 | 2 | 0
INSULATION
30DEC93 | 31DEC93
30DEC93 | 31DEC93
410 | 7 | 0
HANG GYP-BOARD
03JAN94 | 11JAN94
03JAN94 | 11JAN94
420 | 4 | 8
HARDCOAT
12JAN94 | 17JAN94
12JAN94 | 17JAN94
430 | 4 | 17
FINISH CARPENTRY
18JAN94 | 21JAN94
10FEB94 | 15FEB94
440 | 7 | 31
CERAMIC TILE/WINDOW SILL
18JAN94 | 26JAN94
07MAR94 | 10MAR94
440 | 25 | 0
SWIMMING POOL
18JAN94 | 21FEB94
18JAN94 | 21FEB94
450 | 1 | 33
GARAGE DOOR
18JAN94 | 18JAN94
07MAR94 | 07MAR94
460 | 8 | 17
PAINT INTERIOR
24JAN94 | 31JAN94
18FEB94 | 23FEB94
470 | 1 | 33
MEDICINE CABINET
24JAN94 | 24JAN94
10MAR94 | 10MAR94
480 | 1 | 29
GFI ELECTRICAL PANEL FLOOR HOUSE
490 | 2 | 17
SEMI-PERM ELECTRIC
25JAN94 | 26JAN94
07MAR94 | 09MAR94
500 | 3 | 17
CABINETS/VANITIES
01FEB94 | 07FEB94
24FEB94 | 02MAR94
510 | 1 | 25
FIRE-PLACE VENEER
01FEB94 | 01FEB94
15MAR94 | 15MAR94
520 | 1 | 17
APPLIANCES
09FEB94 | 09FEB94
03MAR94 | 07MAR94
520 | 3 | 6
CARPET/VINYL FLOORING
03MAR94 | 07MAR94
11MAR94 | 15MAR94
530 | 3 | 17
PLUMBING TRIM
09FEB94 | 11FEB94
04MAR94 | 08MAR94
540 | 5 | 15
WALLPAPER
09FEB94 | 14FEB94
07MAR94 | 11MAR94
540 | 6 | 17
ELECTRICAL TRIM
01MAR94 | 07MAR94
09MAR94 | 15MAR94
550 | 2 | 0
SITE CLEAN-UP
22FEB94 | 27FEB94
22FEB94 | 27FEB94
560 | 1 | 17
MIRRORS
15FEB94 | 15FEB94
14MAR94 | 14MAR94
560 | 5 | 15
SHOWER DOORS
15FEB94 | 16FEB94
15MAR94 | 15MAR94
570 | 1 | 0
A/C PADS
25FEB94 | 25FEB94
25FEB94 | 25FEB94
570 | 3 | 5
HVAC TRIM
01MAR94 | 03MAR94
21MAR94 | 07MAR94
600 | 8 | 0
WOOD FLOORING
01MAR94 | 15MAR94
06APR94 | 15MAR94
610 | 2 | 0
DRIVEWAY/SIDEWALK
25FEB94 | 02MAR94
04MAR94 | 10MAR94
620 | 8 | 4
LANDSCAPE
03MAR94 | 14MAR94
03MAR94 | 18MAR94
630 | 3 | 8
HOUSE CLEANUP
15APR94 | 19APR94
15APR94 | 19APR94
640 | 1 | 0
FINAL INSPECTION
21MAR94 | 21MAR94
21MAR94 | 21MAR94
510 | 1 | 0
FINAL GRAD.
24FEB94 | 25FEB94
24FEB94 | 25FEB94
LEGEND
Activity
Milestone
Hammock
Summary
Progress
Baseline
Plot Date: 29JAN94
Data Date: 01NOV93
Project Start: 01NOV93
Project Finish: 21MAR94
(c) Primavera Systems, Inc.
TYPICAL HOUSE CPM
PROFESSIONAL BUILDERS, INC.
SAMPLE PURE LOGIC DIAGRAM
DATE
REVISION
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